

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
7 July 2005 (07.07.2005)

PCT

(10) International Publication Number
WO 2005/061201 A1

(51) International Patent Classification⁷: **B29C 44/34**,
44/58, 45/00

(21) International Application Number:
PCT/CA2004/002194

(22) International Filing Date:
23 December 2004 (23.12.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/532,269 23 December 2003 (23.12.2003) US

(71) Applicant (for all designated States except US): **DE-
COMA INTERNATIONAL INC.** [CA/CA]; 50 Casmir
Court, Concord, Ontario L4K 4J5 (CA).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **BUCKLE, Dwight**,
K. [CA/CA]; 14 Ginger court, Guelph, Ontario N1G 5B3
(CA). **JENSEN, Danny, Grunsted, Solberg** [CA/CA];
59 Sylvan Drive, Cambridge, Ontario N1R 5S5 (CA).

DERNOVSEK, Robert [CA/CA]; 23 Jessica Lane, R.R.
#4, Guelph, Ontario N1H 6J1 (CA). **CAVE, Alan, C.**
[CA/CA]; R. R. #2, Mount Forest, Ontario N0G 2L0 (CA).
ESCEDI, Jimmy, M. [CA/CA]; 626 Cold Stream Drive,
Waterloo, Ontario N2V 2H3 (CA). **ZAFERA, Antoine**
[CA/CA]; 566 Bonavista Drive, Waterloo, Ontario N2K
3Z7 (CA).

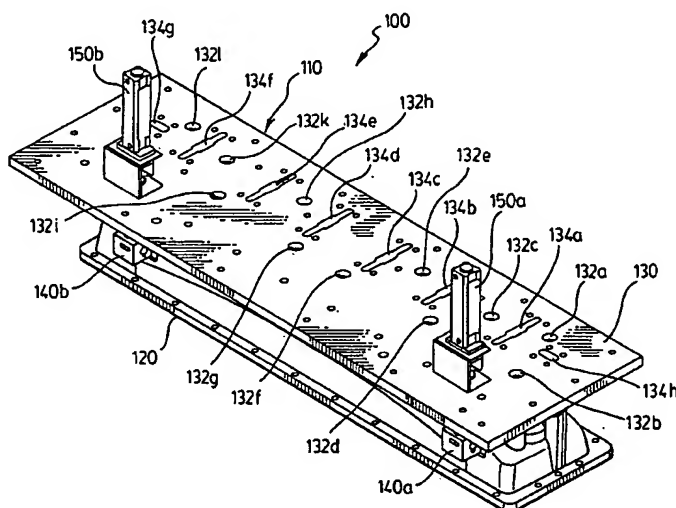
(74) Agents: **BRANDT, Kerstin, B. et al.**; Magna International
Inc., 337 Magna Drive, Aurora, Ontario L4G 7K1 (CA).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

[Continued on next page]

(54) Title: ARTICLE, METHOD AND APPARATUS OF FORMING EXPANDED PLASTIC MATERIALS IN A STEAM CHEST
MOLD



(57) Abstract: The invention provides an article, a method and an apparatus of forming expanded plastic materials in a steam chest mold having out of die draw features. This is achieved by means of a cavity pull system. The cavity pull system allows for the provision of molded features outside the die draw and is designed to operate on a cam type system using two stainless steel rods running at a right angle to one another. A gear mechanism allows molded features, e.g. holes, to be formed at any angle on any part design where enough part geometry exists to accommodate the forming features and in the tool for mechanism components. The invention is advantageously employed in the formation of holes outside the die draw in vertically stacked injection tools for energy absorbers used in vehicle bumper fascias. The provision of out of die draw molded features is useful for fascia component locating or attachment.



ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

— before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

*For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.*